PB-237 841

BACKGROUND INFORMATION FOR STANDARDS OF PERFORMANCE: ELECTRIC ARC FURNACES IN THE STEEL INDUSTRY

VOLUME 2, TEST DATA SUMMARY

ENVIRONMENTAL PROTECTION AGENCY

OCTOBER 1974

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PB 237 841

1. REPORT NO. EPA-450/2-74-017b	2.
4. TITLE AND SUBTITLE Background Information for Standards of Performance: Electric Arc Furnaces in the Steel Industry Volume 2. Summary of Test Data	5. REPORT DATE October 1974
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Research Triangle Park, N.C. 27711	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This volume is the second in a series on the standard of performance for electric arc furnaces in the steel industry. This volume summarizes test data from such facilities.

PRICES SUBJECT TO CHANGE

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution Pollution control Steel industry Electric arc furnaces Standards of performance Steel making	Air pollution control	

18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS (This report) Unclassified	21. NO. OF PAGES 44
	20. SECURITY CLASS (This page) Unclassified	22. PRICE $3.75/2.25

EPA Form 2220-1 (9-73)

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NATIONAL TECHNICAL
INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

EPA-450/2-74-017b

BACKGROUND INFORMATION FOR STANDARDS OF PERFORMANCE: ELECTRIC ARC FURNACES IN THE STEEL INDUSTRY VOLUME 2: TEST DATA SUMMARY

Emission Standards and Engineering Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

October 1974

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Publication No. EPA-450/2-74-017b

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INTRODUCTION

This report summarizes the source test results and visible emission measurements in Background Information for Standards of Performance: Electric Arc Furnaces in the Steel Industry, Volume 1, Proposed Standards (EPA-450/2-74-005a). This volume describes the tested facilities (their operating conditions, characteristics of exhaust gas streams, and deviations from prescribed test procedures) and summarizes the results of the particulate matter and carbon monoxide tests.

Facilities are identified by the same coding used in Volume 1. For example, Table 25 summarizes results of tests performed on Facility J under contract to the owner. These same results are plotted in Figure VI-1 of Volume 1 as Plant J.

Many of the tests summarized herein were conducted using EPA Reference Method 5 for determination of particulate matter from stationary sources.[1/] In these cases, additional measurements were made to evaluate materials that condense and are collected in the impingers as the gases are cooled. In the summaries, the "probe and filter catch" is the particulate emission measurement used in the figures in Volume 1 Background Information and is the basis of the standard of performance. The "total catch" includes the probe and filter catch plus material collected in the impingers.

Other test methods for particulate matter were also used. These methods did not use impingers for collection of the condensable particulate matter. Particulate matter was collected on filters or thimbles. In this sense, these other methods are analogous to the "probe and filter catch" of EPA Method 5.

[1/] Environmental Protection Agency, "Standards of Performance for New Stationary Sources," Federal Register, 36, (247): 24888-24890, December 23, 1971.

SUMMARY OF PARTICULATE AND CARBON MONOXIDE TEST RESULTS

A program was undertaken by EPA to evaluate the particulate and carbon monoxide control techniques available for installation on new or substantially modified electric arc steelmaking facilities. Information was obtained on a number of electric arc steelmaking facilities from literature and contacts with steel companies and control agencies. Sixteen of these facilities were visited. Only three well-controlled shops were found which were testable for particulate matter using present EPA methods. A particulate matter emission test was made on one of these shops which used building evacuation and a baghouse for air pollution control. Measurements of carbon monoxide emissions were also made at this plant. Carbon monoxide tests were also conducted on two other furnaces at two different plants where only direct shell evacuation was used. Data on visible emissions were obtained at several plants. Particulate emission data have also been obtained from industry for other well-controlled electric arc furnace shops. All test data are summarized in Tables 1-28 and presented graphically in Figures 1 through 3.

Facilities

A. One 50 and one 75 ton furnace producing alloy steels. A building evacuation system with a baghouse having six short stacks was used for air pollution control. Three of the stacks were tested for particulate emissions by EPA using EPA

Method 5 (with the single exception that the probe was not heated), and one stack was simultaneously tested using the ASME Method (an alundum thimble followed by a Gelman Type "A" filter; both thimble and filter are inside the stack during testing). Carbon monoxide emissions were determined using a non-dispensive infrared (NDIR) analyzer. Inlet data for particulate matter were also obtained. The plant was operating near design capacity during the tests and the control system was operating well.

B. Five 15 ton furnaces producing alloy steels controlled by a building evacuation system with a baghouse. Only three furnaces were operating during the test. Two samples were collected above the center of one filter compartment. Isokinetic sampling conditions were not maintained. The tests were conducted according to American Air Filter Method No. 139.[1/] The data were supplied by the company.

C. Two 100 ton furnaces and one 75 ton furnace producing carbon and alloy steels controlled by a combination of direct shell evacuation and canopy hoods above each furnace ducted to a common baghouse. Bypass slots recapture dust which escapes the hoods initially. Samples were taken isokinetically at several points in the baghouse compartments above the bags, but formal traversing

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[1/] American Air Filter Company, Inc., "Operating Instructions - Five Inch Dust Sampler and Thirteen Inch Dust Sampler," Report 139, May 16, 1956.

was not performed. Sampling was conducted using a probe and paper thimble in series with a dry gas meter and vacuum pump. The test method did not measure gaseous water in the exhaust gases. Four of the 26 baghouse compartments were tested. Baghouse inlet data were also obtained. A hot scarfing machine which is also controlled by the system was operated for 10 minutes during one of the one-hour tests. The furnaces were operated about 10 to 18 percent above design capacity. The tests were conducted by a local air pollution control agency. Visible emission data at this facility were also obtained by EPA personnel.

D. One 165 ton furnace producing carbon and alloy steels. Direct shell evacuation control with a flooded disc scrubber. Tests for carbon monoxide were conducted on the inlet side of the scrubber using a non-dispersive infrared analyzer. Gas flow measurements were also made. Each test run was initiated at the start of the furnace cycle and was terminated when the furnace was tapped. Test results are reported both on the basis of the first 90 minutes of meltdown (excluding periods when the roof was removed for charging) and on the basis of the entire test period. The control system fan was inoperative for about 10 minutes during the third test run. The furnace was operated near design capacity during the tests.

E. One 150 ton furnace producing carbon steel. Direct shell evacuation control with a baghouse. Tested for carbon monoxide only using a non-dispersive infrared analyzer. Each test run was initiated at the start of the furnace cycle and was terminated when the furnace was tapped. Test results are reported both on the basis of the first 90 minutes of meltdown (excluding periods when the roof was removed for charging), and on the basis of the entire test period. The furnace was operated near design capacity and the control system operated normally during the tests.

G. Two 120 ton furnaces producing carbon steels. Controlled by a building evacuation system and direct shell evacuation systems with two separate baghouses. Visible emission readings were made by EPA Method 9.

I. Three 100 ton furances, one 75 ton furnace, and one 50 ton furnace producing carbon, alloy and stainless steels. Air pollution control is by building evacuation through three baghouses. Two of these baghouses (I1) are in a common structure and exhaust through common short stacks, but have separate inlets. Tests were conducted on both inlets, and one test was made on each of three of the common stacks. Tests were run on the inlet and on three separate stacks (one test on each) on the third baghouse (I2). Tests were made using EPA Method 5 (except the probe was not heated) under contract to the company.

L. Two 25 ton furnaces producing alloy and stainless steels controlled by building evacuation through a baghouse having short stacks. Tests were conducted on the baghouse inlet and on three stacks (one test on each). Tests were made using EPA Method 5 under contract to the company.

M. Two 100 ton and one 150 ton furnaces producing carbon steels. Direct shell evacuation and a canopy hood system with three separate baghouses control air pollutants. The 150 ton furnace was not operating during the emission test. The canopy hood baghouse was tested by EPA Method 5. One of the two direct shell evacuation baghouses was sampled by traversing the exhaust monitor with a Method 5 sampling train. Data were supplied by the company. Visible emission data were also obtained by EPA and contractor personnel using EPA Method 9 for visible emissions.

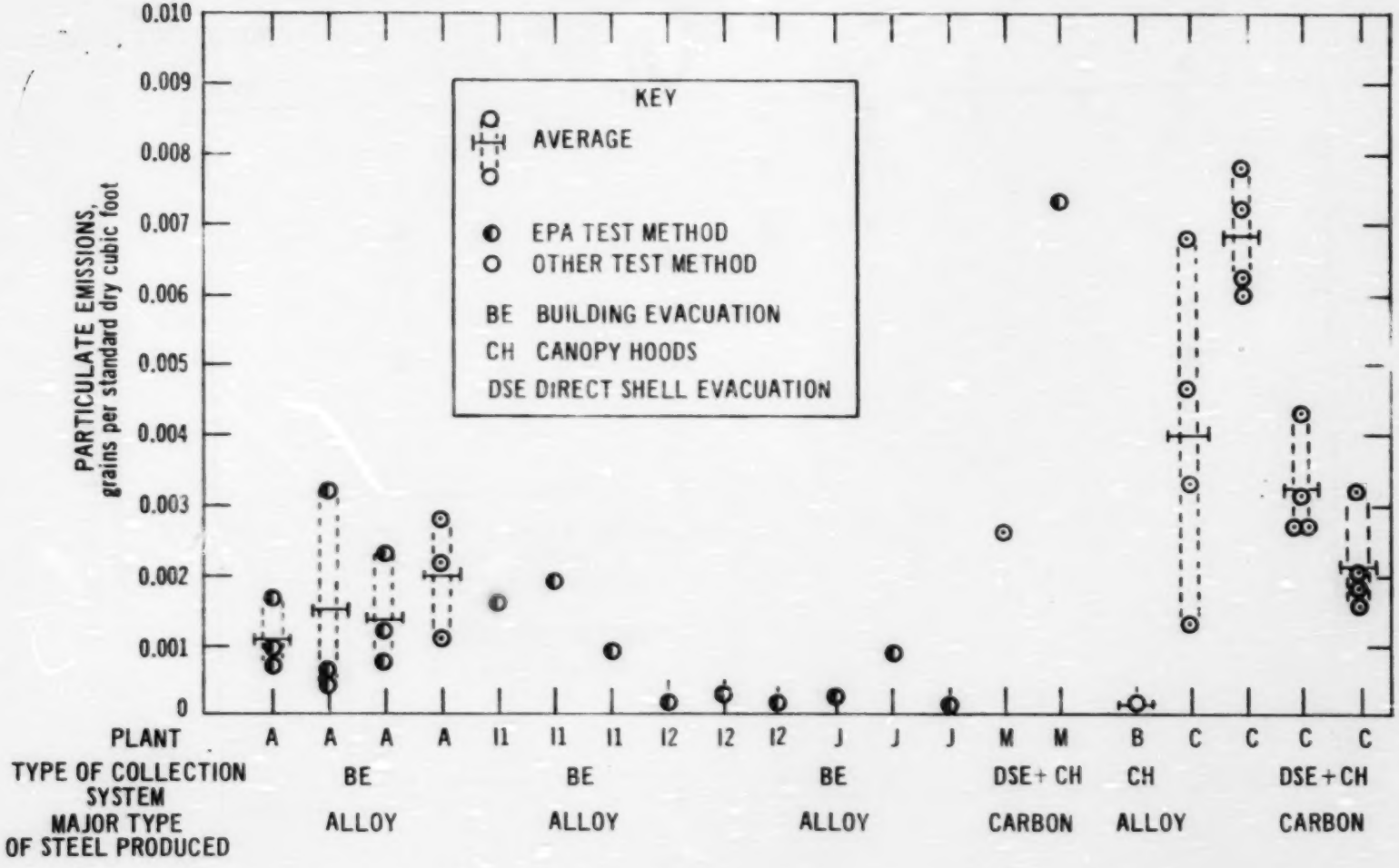


Figure 1. Particulate emissions (gr/sdcf) from electric arc furnace shops.

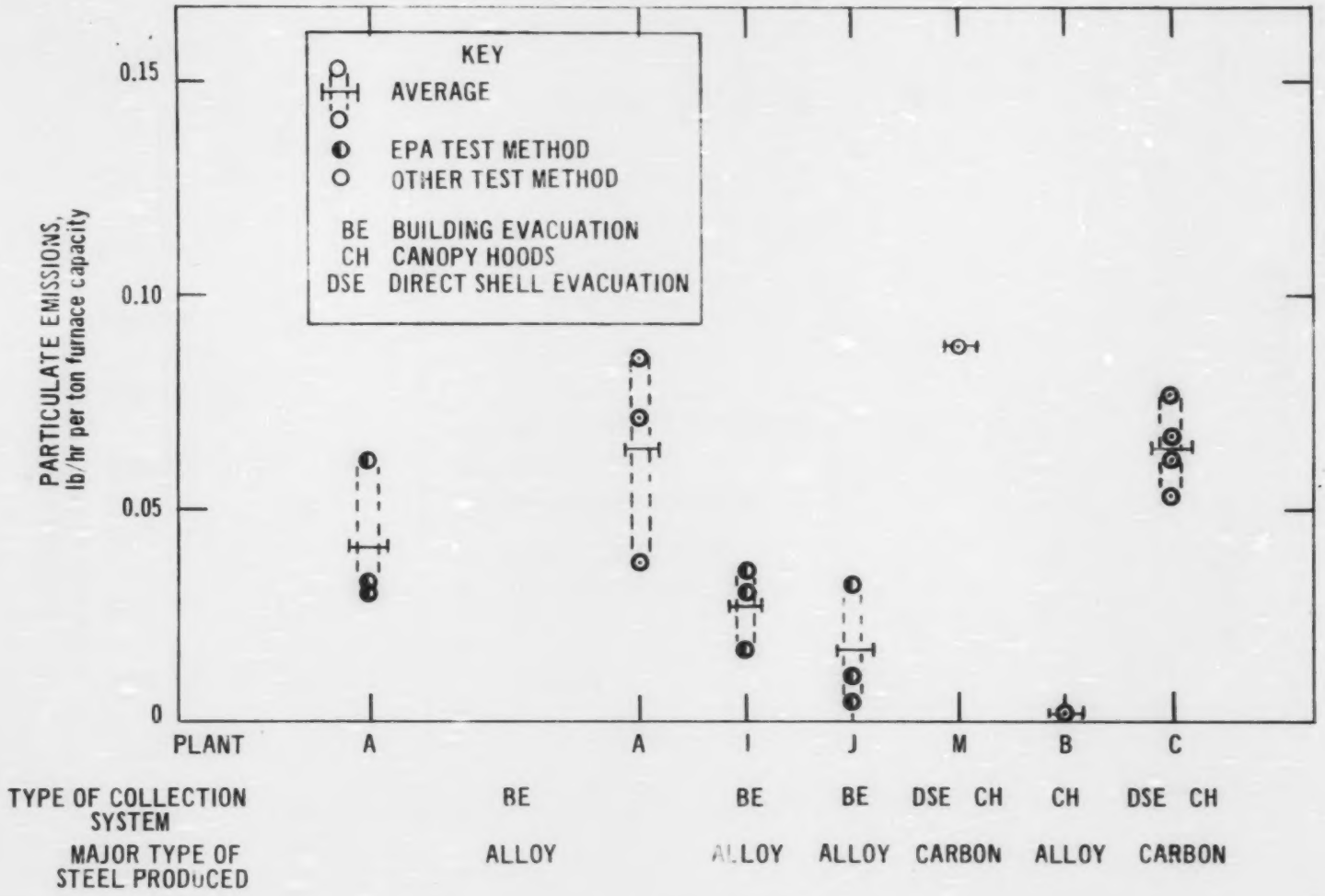


Figure 2. Particulate emissions (lb/hr) from electric arc furnace shops.

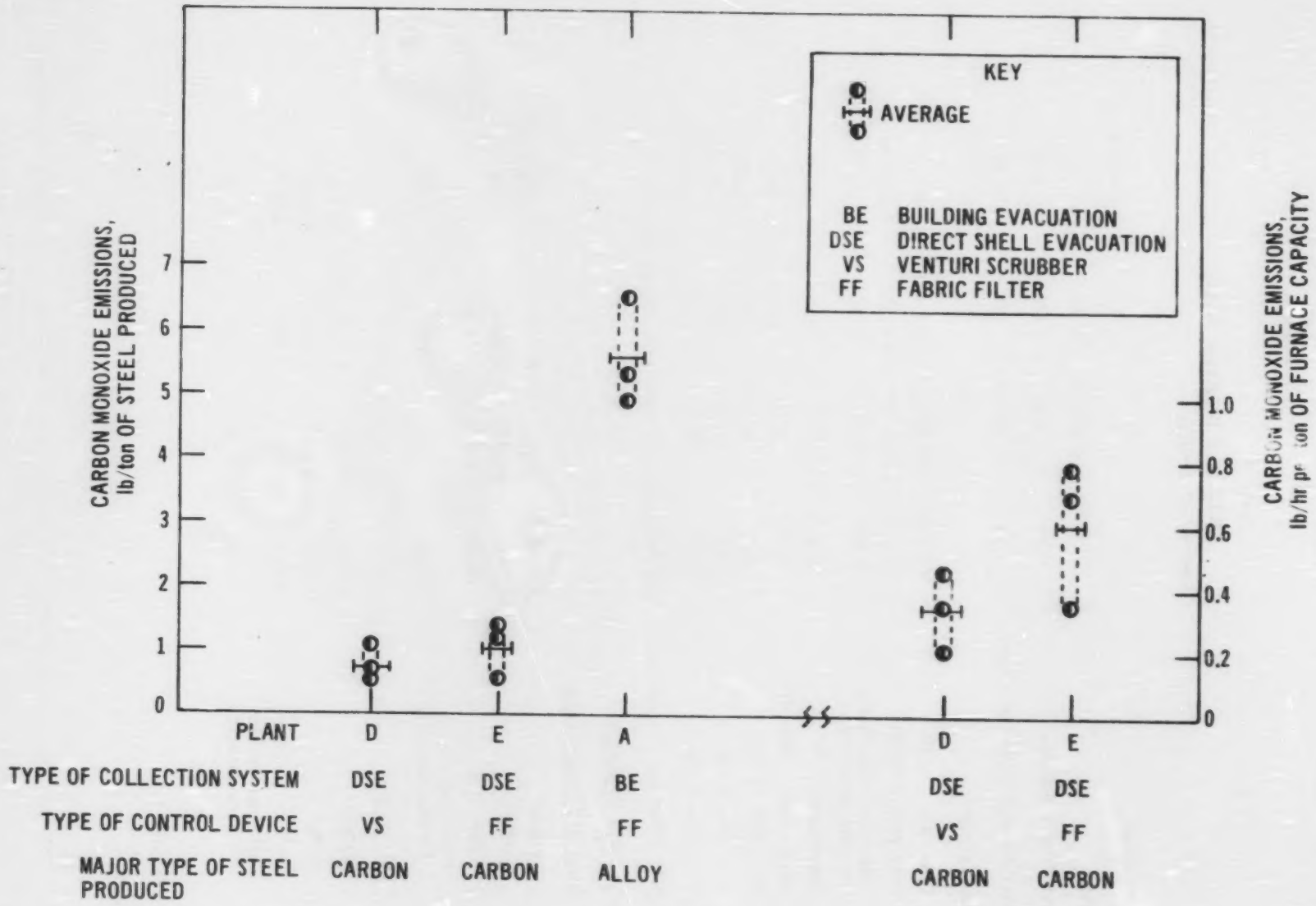


Figure 3. Carbon monoxide emissions from electric arc furnaces.

Table 1

FACILITY A (Baghouse Inlet)

Summary of Results

Run Number	1	2	3	Average
Date	10/18/72	10/19/72	10/20/72	-
Test Time - Minutes	240	240	240	240
Total Furnace Capacity - tons	125	125	125	125
Shop Effluent				
Flow rate - ACFM	471,699	497,016	504,697	491,137
Flow rate - DSCFM	431,236	454,932	470,300	452,156
Flow rate - DSCFM/ton of furnace capacity	3,450	3,640	3,760	3,620
Temperature - ^{o}F	98.6	100.4	94.8	97.9
Water vapor - Vol. %	0.7	0.6	0.6	0.63
CO_2 - Vol. % dry	0.1	0.1	0.0	0.067
O_2 - Vol. % dry	20.6	20.2	20.7	20.5
CO - Vol. % dry	<0.1	<0.1	<0.1	<0.1
Visible Emissions - % opacity	Shop building emissions were 0% opacity.			
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0386	0.0564	0.0605	0.0518
gr/ACF	0.0353	0.0516	0.0564	0.0478
lb/hr	142.8	219.9	244.0	202.2
lb/hr per ton of furnace capacity	1.14	1.76	1.95	1.62
Total catch				
gr/DSCF	0.0397	0.0597	0.0618	0.0537
gr/ACF	0.0364	0.0547	0.0576	0.0496
lb/hr	147.0	233.0	249.2	209.7
lb/hr per ton of furnace capacity	1.18	1.86	1.99	1.68

Reference 1.

Table 2

FACILITY A (Stack No. 3)

Summary of Results

Run Number	1	2	3	Average
Date	10/18/72	10/19/72	10/20/72	-
Test Time - Minutes	240	240	240	240
Total Furnace Capacity - tons	125	125	125	125
Baghouse Inlet Flow Rate - DSCFM	431,236	454,932	470,300	452,156
Stack Effluent				
Flow rate - ACFM	75,740	77,511	77,535	76,929
Flow rate - DSCFM	69,135	71,209	71,127	70,490
Temperature - ^{o}F	103.0	101.7	99.1	101.3
Water vapor - Vol. %	0.6	0.5	0.4	0.5
CO_2 - Vol. % dry	0.1	0.1	0.0	0.067
O_2 - Vol. % dry	20.6	20.2	20.7	20.5
CO - Vol. % dry	<0.1	<0.1	<0.1	<0.1
Visible Emissions - % opacity	0%	0%	0%	0%
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0007	0.0010	0.0017	0.0011
gr/ACF	0.0007	0.0010	0.0017	0.0011
lb/hr (1)	2.59	3.90	6.85	4.45
lb/hr per ton of furnace capacity	0.021	0.031	0.055	0.036
Total catch				
gr/DSCF	0.0022	0.0019	0.0047	0.0029
gr/ACF	0.0020	0.0018	0.0044	0.0027
lb/hr (2)	8.13	7.41	18.95	11.50
lb/hr per ton of furnace capacity	0.065	0.593	0.152	0.092

(1) Calculated as product of front half stack grain loading and total baghouse inlet flow.

(2) Calculated as product of total stack grain loading and total baghouse inlet flow.

Reference 1.

Table 3

FACILITY A (Stack No. 4)

Summary of Results

Run Number	1	2	3	Average
Date	10/18/72	10/19/72	10/20/72	-
Test Time - Minutes	240	240	240	240
Total Furnace Capacity - tons	125	125	125	125
Baghouse Inlet Flow Rate - DSCFM	431,236	464,932	470,300	452,156
Stack Effluent				
Flow rate - ACFM	73,938	75,653	77,521	75,704
Flow rate - DSCFM	67,479	69,574	70,241	69,098
Temperature - ^{o}F	103.1	101.7	99.2	101.3
Water vapor - Vol. %	0.6	0.5	0.4	0.5
CO_2 - Vol. % dry	0.1	0.1	0.0	0.067
O_2 - Vol. % dry	20.6	20.2	20.7	20.5
CO - Vol. % dry	<0.1	<0.1	<0.1	<0.1
Visible Emissions - % opacity	0%	0%	0%	0%
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0032	0.0007	0.0005	0.0015
gr/ACF	0.0030	0.0007	0.0005	0.0014
lb/hr (1)	11.8	2.73	2.02	5.52
lb/hr per ton of furnace capacity	0.094	0.022	0.016	0.044
Total catch				
gr/DSCF	0.0046	0.0014	0.0015	0.0025
gr/ACF	0.0043	0.0013	0.0014	0.0023
lb/hr (2)	17.0	5.46	6.05	9.50
lb/hr per ton of furnace capacity	0.136	0.044	0.048	0.076

(1) Calculated as product of front half stack grain loading and total baghouse inlet flow.
(2) Calculated as product of total stack grain loading and total baghouse inlet flow.
Reference 1.

Table 4

FACILITY A(Stack No. 6)

Summary of Results

Run Number	1	2	3	Average
Date	10/18/72	10/19/72	10/20/72	-
Test Time - Minutes	240	240	240	240
Total Furnace Capacity - tons	125	125	125	125
Baghouse Inlet Flow Rate - DSCFM	431,236	454,932	470,300	452,156
Stack Effluent				
Flow rate - ACFM	79,295	71,315	75,536	75,382
Flow rate - DSCFM	72,729	65,648	69,915	69,431
Temperature - ^{o}F	100.3	100.0	100.2	100.2
Water vapor - Vol. %	0.6	0.6	0.7	0.63
CO_2 - Vol. % dry	0.1	0.1	0.0	0.067
O_2 - Vol. % dry	20.6	20.2	20.7	20.5
CO - Vol. % dry	<0.1	<0.1	<0.1	<0.1
Visible Emissions - % opacity	0%	0%	0%	0%
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0023	0.0012	0.0008	0.0014
gr/ACF	0.0022	0.0012	0.0007	0.0014
lb/hr (1)	8.50	4.68	3.23	5.47
lb/hr per ton of furnace capacity	0.068	0.037	0.026	0.044
Total catch				
gr/DSCF	0.0038	0.0024	0.0016	0.0026
gr/ACF	0.0035	0.0022	0.0015	0.0024
lb/hr (2)	14.1	9.36	0.052	9.95
lb/hr per ton of furnace capacity	0.1124	0.075	0.052	0.080

(1) Calculated as product of front half stack grain loading and total baghouse inlet flow.

(2) Calculated as product of total stack grain loading and total baghouse inlet flow.

Reference 1.

Table 5

FACILITY A (Stack No. 6, ASME Test)

Summary of Results

Run Number	1	2	3	Average
Date	10/18/72	10/19/72	10/20/72	-
Test Time - Minutes	240	240	240	240
Total Furnace Capacity - tons	125	125	125	125
Baghouse Inlet Flow Rate - DSCFM	431,236	454,932	470,300	452,156
Stack Effluent				
Flow rate - ACFM	77,753	76,875	76,468	77,032
Flow rate - DSCFM	71,390	70,912	71,527	71,276
Temperature - ^{o}F	100.1	100.0	96.6	98.9
Water vapor - Vol. %	0.5	0.4	0.3	0.4
CO_2 - Vol. % dry	0.1	0.1	0.0	0.067
O_2 - Vol. % dry	20.6	20.2	20.7	20.5
CO - Vol. % dry	<0.1	<0.1	<0.1	<0.1
Visible Emissions - % opacity	0%	0%	0%	0%
Particulate Emissions				
Nozzle, thimble Probe and filter catch				
gr/DSCF	0.0019	0.0014	0.0008	0.0014
gr/ACF	0.0018	0.0013	0.0008	0.0013
lb/hr(1)	7.02	5.46	3.22	5.23
lb/hr per ton of furnace capacity	0.056	0.044	0.026	0.042
Total catch				
gr/DSCF	0.0035	0.0020	0.0018	0.0024
gr/ACF	0.0033	0.0019	0.0017	0.0023
lb/hr (2)	12.9	7.80	7.26	9.33
lb/hr per ton of furnace capacity	0.104	0.062	0.058	0.075

(1) Calculated as product of grain loading (based on nozzle, thimble, probe, and filter catch) and total baghouse inlet flow.

(2) Calculated as product of total stack grain loading and total baghouse inlet flow. Reference 1.

Table 6

FACILITY A (Stack No. 1, CO Measurements)

Summary of Results

Run Number	1	2	3	Average
Date	10/18/72	10/19/72	10/20/72	-
Test Time-Minutes	240	265	240	248
Furnace Capacity - Tons (total)	125	125	125	125
Baghouse Inlet Flow Rate - DSCFM	431,236	454,932	470,300	452,156
Stack Effluent				
Flow rate-ACFM	74,007	75,537	78,632	76,059
Flow rate-DSCFM	67,468	69,141	72,835	69,815
Temperature-°F	104.1	102.8	101.5	102.8
Water vapor-Vol. %	0.5	0.7	0.4	0.53
CO_2-Vol. % dry	0.1	0.1	0.0	0.067
O_2-Vol. % dry	20.6	20.2	20.7	20.5
CO-Vol. % dry (Orsat)	<0.1	<0.1	<0.1	<0.1
Carbon Monoxide Emissions(1)				
Average ppm (by volume)	62	48	43	51
lb/hr.(2)	116.2	94.9	87.9	99.7
lb/ton of steel produced	6.51	5.31	4.92	5.58
lb/hr. per ton of furnace capacity (2)	0.930	0.759	0.703	0.797

(1) Corrected for ambient CO concentration. Based on entire test period.

(2) Calculated using average CO concentration and total baghouse inlet flow.

Reference 1.

Table 7

FACILITY B

Summary of Results

Run Number	1	2
Date	12/15-16/74	
Test Time-minutes	240	240
Total Furnace Capacity - tons	45	45
Stack Effluent		
Flow rate - ACFM	-	-
Flow rate - DSCFM	-	-
Temperature - °F	66	66
Water vapor - Vol.%	-	-
CO_2 - Vol.% dry	-	-
O_2 - Vol.% dry	-	-
CO - Vol.% dry	-	-
Visible Emissions - % opacity	-	-
Particulate Emissions		
gr/DSCF	2×10^{-5}	none detected
gr/ACF	2×10^{-5}	-
lb/hr	-	-
lb/hr per ton of furnace capacity	-	-

Reference 2.

Table 8

FACILITY C (Baghouse Inlet)

Summary of Results

Run Number	1	2[1]	3	4	Average
Date	12/1/65	12/1/65	12/1/65	12/1/65	-
Test Time - Minutes	60	60	60	21	50.25
Total Furnace Capacity - tons	275	275	275	275	275
Shop Effluent					
Flow rate - ACFM[2]	598,000	619,000	634,000	674,000	631,000
Flow rate - SCFM [2][3]	499,400	509,600	519,800	530,000	514,700
Flow rate - SCFM/ton of furnace capacity[3]	1820	1850	1890	1930	1870
Temperature - ^{o}F	170	190	200	200	190
Water vapor - Vol. %	-	-	-	-	-
CO_2 - Vol. % dry	-	-	-	-	-
O_2 - Vol. % dry	-	-	-	-	-
CO - Vol. % dry	-	-	-	-	-
Visible Emissions - % opacity	-	-	-	-	-
Particulate Emissions					
Probe and thimble catch					
gr/SCF[3]	0.49	0.53	0.31	0.24	0.39
gr/ACF	0.45	0.47	0.28	0.21	0.35
lb/hr[4]	2100	2320	1380	1090	1720
lb/hr per ton of furnace capacity	7.64	8.44	5.02	3.96	6.26

(1) A hot scarfing machine was operating for 10 minutes during run no. 2.
(2) Gas flow measurements were not simultaneous with the particulate concentration measurements.
(3) The water content of the gas stream was not determined. Therefore, results are reported in "wet" scf.
(4) Calculated as the product of the particulate concentration in the gas stream and gas flows obtained by traversing non-simultaneously.

Reference 3.

Table 9

FACILITY C (Compartment No. 4)

Summary of Results

Run Number	1	2(1)	3	4	Average
Date	12/1/65	12/1/65	12/1/65	12/1/65	-
Test Time - Minutes	60	60	60	62	60.5
Total Furnace Capacity - tons	275	275	275	275	275
Baghouse Inlet Flow Rate - SCFM (2)(3)	499,400	509,600	519,800	530,000	514,700
Stack Effluent					
Flow rate - ACFM	-	-	-	-	-
Flow rate - SCFM	-	-	-	-	-
Temperature - ^{o}F	153	167	156	155	157.8
Water vapor - Vol. %	-	-	-	-	-
CO_2 - Vol. % dry	-	-	-	-	-
O_2 - Vol. % dry	-	-	-	-	-
CO - Vol. % dry	-	-	-	-	-
Visible Emissions - % opacity	-	-	-	-	-
Particulate Emissions					
Probe and Thimble Catch					
gr/SCF(3)	0.0013	0.0032	0.0046	0.0067	0.0040
gr/ACF	0.0012	0.0029	0.0042	0.0061	0.0036
lb/hr(4)	5.56	14.0	20.5	30.4	17.6
lb/hr per ton of furnace capacity	0.020	0.051	0.075	0.111	0.064

(1) A hot scarfing machine was operating for 10 minutes during run No. 2.
(2) Gas flow measurements were made simultaneously with the particulate concentration measurements.
(3) Not corrected for water content of gas stream.
(4) Calculated as the product of the total baghouse inlet flow rate and the outlet particulate concentration.

Reference 3.

Table 10

FACILITY C (Compartment No. 10)

Summary of Results

Run Number	1	2[1]	3	4	Average
Date	12/1/65	12/1/65	12/1/65	12/1/65	-
Test Time - Minutes	60	60	60	61	60.3
Total Furnace Capacity - tons	275	275	275	275	275
Baghouse Inlet Flow Rate - SCFM[2][3]	499,400	509,600	519,800	530,000	514,700
Stack Effluent					
Flow rate - ACFM	-	-	-	-	-
Flow rate - DSCFM	-	-	-	-	-
Temperature - ^{o}F	-	-	-	-	-
Water vapor - Vol. %	-	-	-	-	-
CO_2 - Vol. % dry	-	-	-	-	-
O_2 - Vol. % dry	-	-	-	-	-
CO - Vol. % dry	-	-	-	-	-
Visible Emissions - % opacity					
Particulate Emissions					
Probe and thimble catch					
gr/SCF[3]	0.0077	0.0071	0.0061	0.0059	0.0067
gr/ACF	0.0069	0.0063	0.0054	0.0052	0.0060
lb/hr[4]	33.0	31.0	27.2	26.8	29.5
lb/hr per ton of furnace capacity	0.120	0.113	0.099	0.097	0.107

(1) A hot scarfing machine was operating for 10 minutes during run No. 2.
(2) Gas flow measurements were made simultaneously with the particulate concentration measurements.
(3) Not corrected for water content of gas stream.
(4) Calculated as the product of the total baghouse inlet flow rate and the outlet particulate concentration.

Reference 3.

Table 11

FACILITY C (Compartment No. 17)

Summary of Results

Run Number	1	2[1]	3	4	Average
Date	12/1/65	12/1/65	12/1/65	12/1/65	-
Test Time - Minutes	60	60	60	66	61.5
Total Furnace Capacity - tons	275	275	275	275	275
Baghouse Inlet Flow Rate - SCFM [2][3]	499,400	509,600	519,800	530,000	514,700
Stack Effluent					
Flow rate - ACFM	-	-	-	-	-
Flow rate - DSCFM	-	-	-	-	-
Temperature - ^{o}F	-	-	-	-	-
Water vapor - Vol. %	-	-	-	-	-
CO_2 - Vol. % dry	-	-	-	-	-
O_2 - Vol. % dry	-	-	-	-	-
CO - Vol. % dry	-	-	-	-	-
Visible Emissions - % opacity	-	-	-	-	-
Particulate Emissions					
Probe and thimble catch					
gr/SCF [3]	0.0030	0.0042	0.0026	0.0026	0.0031
gr/ACF	0.0027	0.0037	0.0023	0.0024	0.0028
lb/hr [4]	12.8	18.3	11.6	11.8	13.6
lb/hr per ton of furnace capacity	0.047	0.067	0.042	0.043	0.049

(1) A hot scarfing machine was operating for 10 minutes during run No. 2.
(2) Gas flow measurements were made simultaneously with the particulate concentration measurements.
(3) Not corrected for water content of gas stream.
(4) Calculated as the product of the total baghouse inlet flow rate and the outlet particulate concentration.

Reference 3.

Table 12

FACILITY C (Compartment No. 23)

Summary of Results

Run Number	1	2[1]	3	4	Average
Date	12/1/65	12/1/65	12/1/65	12/1/65	-
Test Time - Minutes	60	60	60	53	58.3
Total Furnace Capacity - tons	275	275	275	275	275
Baghouse Inlet Flow Rate - SCFM [2][3]	499,400	509,600	519,800	530,000	514,700
Stack Effluent					
Flow rate - ACFM	-	-	-	-	-
Flow rate - DSCFM	-	-	-	-	-
Temperature - ^{o}F	130	130	130	130	130
Water vapor - Vol. %	-	-	-	-	-
CO_2 - Vol. % dry	-	-	-	-	-
O_2 - Vol. % dry	-	-	-	-	-
CO - Vol. % dry	-	-	-	-	-
Visible Emissions - % opacity	-	-	-	-	-
Particulate Emissions					
Probe and thimble catch					
gr/SCF [3]	0.0015	0.0020	0.0017	0.0031	0.0021
gr/ACF	0.0013	0.0017	0.0015	0.0028	0.0018
lb/hr [4]	6.42	8.74	7.57	14.1	9.21
lb/hr per ton of furnace capacity	0.023	0.032	0.028	0.051	0.034

(1) A hot scarfing machine was operating for 10 minutes during run No. 2.
(2) Gas flow measurements were made simultaneously with the particle concentration measurements.
(3) Not corrected for water content of gas stream.
(4) Calculated as the product of the total baghouse inlet flow rate and the outlet particulate concentration.

Reference 3.

Table 13

FACILITY C

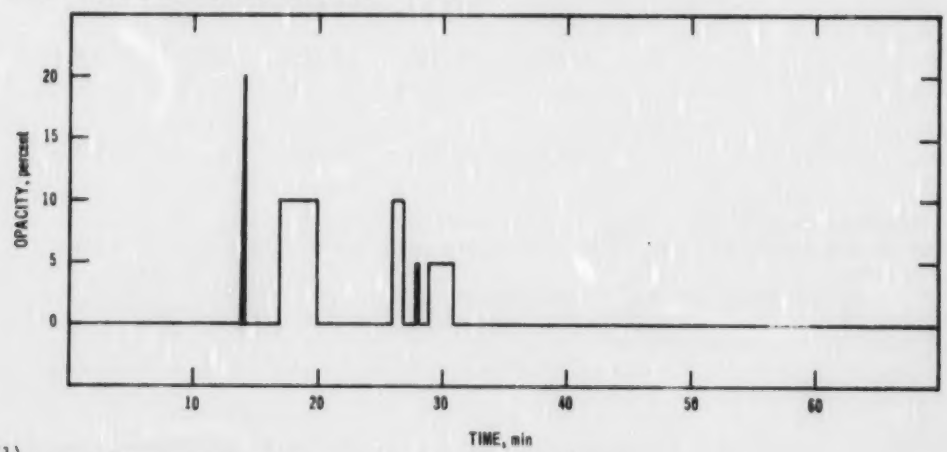
SUMMARY OF VISIBLE EMISSIONS

Date:	11/10/72		
Type of Plant:	Electric Arc Furnace Shop		
Type of Discharge:	Monitor	Distance from Observer to Discharge Point:	~1000 ft.
Location of Discharge:	Roof of Shop(1)	Height of Observation Point:	Ground level
Height of Point of Discharge:	~100 ft.	Direction of Observer from Discharge Point:	West
Description of Background:	Sky		
Description of Sky:	Partly overcast		
Wind Direction:	-	Wind Velocity:	Calm mi/hr
Color of Plume:	White	Detached Plume:	No
Interference of Steam Plume:	No		
Duration of Observation:	64 min.		

Summary of Data:

Opacity, Percent	Total Time Equal to or Greater Than Given Opacity		Opacity, Percent	Total Time Equal to or Greater Than Given Opacity	
	Min.	Sec.		Min.	Sec.
5	7	0	55	-	-
10	4	30	60	-	-
15	0	30	65	-	-
20	0	30	70	-	-
25	0	0	75	-	-
30	-	-	80	-	-
35	-	-	85	-	-
40	-	-	90	-	-
45	-	-	95	-	-
50	-	-	100	-	-

Sketch Showing How Opacity Varied With Time:(2)



(1) No opacities above 5 percent were observed from the baghouse.

(2) Emissions correspond to periods when louvers in the monitor were open.

Reference 4.

Table 14

FACILITY D (CO Measurements)

Summary of Results

Run Number	1	2	3 (1)	Average
Date	12/19/72	12/19/72	12/19/72	-
Test Time - Minutes	215	190	165	190
Furnace Capacity - tons	165	165	165	165
Furnace Effluent Average Flow rate - ACFM(2)	-	-	-	-
Average Flow rate - DSCFM	53,600	50,000	47,400	50,300
Average Temperature °F(2)	-	-	-	-
Water Vapor - Vol. % (estimate)	0.96	0.96	0.96	0.96
CO_2 - Vol. % dry	3.2	2.0	2.4	2.5
O_2 - Vol. % dry	18.6	18.9	18.9	18.8
CO - Vol. % dry (Orsat)	0	0	0	0
Carbon Monoxide Emissions (3)				
Average ppm (by volume)	95.6	147	349	197
lb/hr. (4)	21.5	31.4	51.2	34.7
lb/ton of steel produced	0.52	0.69	1.07	0.76
lb/hr. per ton of furnace capacity	0.13	0.19	0.31	0.21
Carbon Monoxide Emissions (5)				
Average ppm (by volume)	159	276	506	314
lb/hr(4)	34.5	58.5	75.3	48.0
lb/hr per ton of furnace capacity	0.21	0.35	0.46	0.34

(1) Control system fan was off for about 10 minutes.

(2) Not Calculated.

(3) Based on entire test period.

(4) Calculated as a summation of the products of average flow and average concentration for 5 minute intervals.

(5) Based on the first 90 minutes of the test, excluding time when the furnace roof was open, or the DSE system was not operated.

Reference 5.

Table 15

FACILITY E (CO Measurements)

Summary of Results

Run Number	1	2	3	Average
Date	12/15/72	12/16/72	12/16/72	-
Test Time - Minutes	145	160	155	153
Furnace Capacity - Tons	150	150	150	150
Furnace Effluent				
Average Flow rate - ACFM(1)	-	-	-	-
Average Flow rate - DSCFM	56,500	29,800	31,100	39,100
Average Temperature - °F(1)	-	-	-	-
Water vapor - Vol. % (estimate)	8.6	8.6	8.6	8.6
CO_2 - Vol. % dry	2.7	3.6(2)	3.6(2)	3.3
O_2 - Vol. % dry	17.4	17.4(2)	17.4(2)	17.4
CO - Vol % dry (Orsat)	0	0	0	0
Carbon Monoxide Emissions(3)				
Average ppm (by volume)	477	596	259	444
lb/hr.(4)	87.0	75.0	34.5	65.5
lb/ton of steel produced	1.39	1.20	0.54	1.04
lb/hr. per ton of furnace capacity	0.58	0.50	0.23	0.44
Carbon Monoxide Emissions(5)				
Average ppm (by volume)	765	827	354	649
lb/hr(4)	117.0	103.5	52.5	91.0
lb/hr per ton of furnace capacity	0.78	0.69	0.35	0.61

(1) Not calculated.
(2) From Orsat analysis of bag sample collected during both the second and third test runs.
(3) Based on entire test period.
(4) Calculated as a summation of the products of average flow and average concentration for 5 minute intervals.
(5) Based on the first 90 minutes of the test, excluding time when the furnace roof was open, or the DSE system was not operated.

Reference 6.

Table 16

FACILITY G

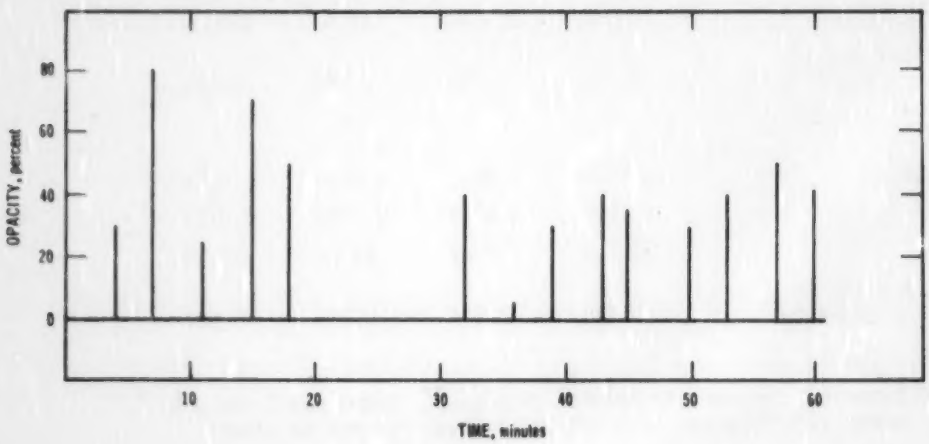
SUMMARY OF VISIBLE EMISSIONS

Date:	11/9/72		
Type of Plant:	Electric Arc Furnace Shop		
Type of Discharge:	Monitor	Distance from Observer to Discharge Point:	~800 ft.
Location of Discharge:	Top of Canopy Hood Baghouse (1)	Height of Observation Point:	Ground level
Height of Point of Discharge:	~150 ft.	Direction of Observer from Discharge Point:	East
Description of Background:	Sky		
Description of Sky:	Overcast, light rain		
Wind Direction:	South	Wind Velocity:	10-15 mi/hr
Color of Plume:	Brown	Detached Plume:	No
Interference of Steam Plume:	No		
Duration of Observation:	60 min.		

Summary of Data:

Opacity, Percent	Total Time Equal to or Greater Than Given Opacity		Opacity, Percent	Total Time Equal to or Greater Than Given Opacity	
	Min.	Sec.		Min.	Sec.
5	1	15	55	0	10
10	1	10	60	0	10
15	1	10	65	0	10
20	1	10	70	0	10
25	1	10	75	0	5
30	1	5	80	0	5
35	0	45	85	0	0
40	0	40	90	-	-
45	0	20	95	-	-
50	0	20	100	-	-

Sketch Showing How Opacity Varied With Time:



(1) No visible emissions were observed from the shop building or the baghouse for the direct shell evacuation system.

Reference 4.

Table 17

FACILITY I (Baghouse No. 1 Inlet)(1)

Summary of Results

Run Number	1	2	3	Average
Date	12/15/72	12/18/72	12/18/72	-
Test Time - Minutes	105	118	112	111.7
Total Furnace Capacity - tons	425	425	425	425
Shop Effluent				
Flow rate - ACFM	359,408	359,381	359,346	359,378
Flow rate - DSCFM	356,428	327,227	327,317	336,990
Flow rate - DSCFM/ton of furnace capacity	838.7	769.9	770.2	792.9
Temperature - ^{o}F	116	116	116	116
Water vapor - Vol. %	0.8300	0.8124	0.7750	0.8058
CO_2 - Vol. % dry	0.31	0.30	0.31	0.307
O_2 - Vol. % dry	18.90	19.00	19.00	18.97
CO - Vol. % dry	0	0	0	0
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.1120	0.0754	0.0515	0.0796
gr/ACF	0.1019	0.0687	0.0469	0.0725
lb/hr	313.98	211.44	144.42	223.28
lb/hr per ton of furnace capacity	0.739	0.497	0.340	0.525
Total catch				
gr/DSCF	0.1133	0.0780	0.0530	0.0814
gr/ACF	0.1032	0.0710	0.0483	0.0757
lb/hr	317.80	218.65	148.69	228.38
lb/hr per ton of furnace capacity	0.748	0.514	0.350	0.537

(1) Three baghouses are used to control this shop. Baghouses 1 and 2 are in a common structure and both exhaust through one set of stacks.

Reference 7.

Table 18

FACILITY I (Baghouse No. 2 Inlet)(1)

Summary of Results

Run Number	1	2	3	Average
Date	12/15/72	12/18/72	12/18/72	-
Test Time - Minutes	96	110	110	105.3
Total Furnace Capacity - tons	425	425	425	425
Shop Effluent				
Flow rate - ACFM	556,308	555,933	555,943	556,061
Flow rate - DSCFM	512,267	512,942	513,165	512,791
Flow rate - DSCFM/ton of furnace capacity	1205.3	1206.9	1207.4	1206.6
Temperature - ^{o}F	109	109	109	109
Water vapor - Vol. %	0.9089	0.7113	0.6702	0.7635
CO_2 - Vol. % dry	0.31	0.32	0.31	0.313
O_2 - Vol. % dry	18.80	19.20	19.10	19.03
CO - Vol. % dry	0	0	0	0
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0155	0.0335	0.0340	0.0277
gr/ACF	0.0142	0.0309	0.0314	0.0255
lb/hr	67.93	147.23	149.54	121.57
lb/hr per ton of furnace capacity	0.160	0.346	0.352	0.286
Total catch				
gr/DSCF	0.0170	0.0346	0.0353	0.0290
gr/ACF	0.0156	0.0319	0.0326	0.0276
lb/hr	74.47	152.12	155.32	127.30
lb/hr per ton of furnace capacity	0.175	0.358	0.365	0.299

(1) Three baghouses are used to control this shop. Baghouses 1 and 2 are in a common structure and both exhaust through one set of stacks.

Reference 7.

Table 19

FACILITY I (Baghouse No. 3 Inlet)[1]

Summary of Results

Run Number	1	2	3	Average
Date	12/13/73	12/13/73	12/14/72	-
Test Time - Minutes	133	100	100	111
Total Furnace Capacity - tons	425	425	425	425
Shop Effluent				
Flow rate - ACFM	570,482	570,340	572,584	571,135
Flow rate - DSCFM	529,390	529,925	532,589	530,635
Flow rate - DSCFM/ton of furnace capacity	1245.6	1246.9	1253.2	1248.6
Temperature - ^{o}F	104	104	104	104
Water vapor - Vol. %	1.0147	0.8900	0.9170	0.9406
CO_2 - Vol. % dry	0.32	0.35	0.30	0.323
O_2 - Vol. % dry	19.70	19.60	19.80	19.70
CO - Vol. % dry	0	0	0	0
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0569	0.0683	0.0463	0.0572
gr/ACF	0.0528	0.0635	0.0430	0.0531
lb/hr	258.30	310.29	211.23	259.94
lb/hr per ton of furnace capacity	0.608	0.730	0.497	0.612
Total catch				
gr/DSCF	0.0571	0.0695	0.0467	0.0578
gr/ACF	0.0530	0.0646	0.0434	0.0537
lb/hr	259.18	315.82	213.06	262.69
lb/hr per ton of furnace capacity	0.610	0.743	0.501	0.618

(1) Three baghouses are used to control this shop. Baghouses 1 and 2 are in a common structure and both exhaust through one set of stacks.

Reference 7.

Table 20

FACILITY I (Overall Inlet Data)

Summary of Results

Run Number(1)	1	2	3	Average
Date	-	-	-	-
Test Time - Minutes	-	-	-	-
Total Furnace Capacity - tons	425	425	425	425
Shop Effluent				
Flow rate - ACFM	1,486,198	1,485,654	1,487,873	1,486,575
Flow rate - DSCFM	1,398,082	1,370,094	1,373,071	1,380,416
Flow rate - DSCFM/ton of furnace capacity	3289.6	3223.8	3230.8	3248.0
Temperature - ^{o}F	-	-	-	-
Water vapor - Vol. %	-	-	-	-
CO_2 - Vol. % dry	-	-	-	-
O_2 - Vol. % dry	-	-	-	-
CO - Vol. % dry	-	-	-	-
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	-	-	-	-
gr/ACF	-	-	-	-
Total lb/hr	640.21	668.96	505.19	604.79
Total lb/hr per ton of furnace capacity	1.51	1.57	1.19	1.42
Total catch				
gr/DSCF	-	-	-	-
gr/ACF	-	-	-	-
Total lb/hr	651.45	686.59	517.07	618.37
Total lb/hr per ton of furnace capacity	1.53	1.62	1.22	1.46

(1) Overall inlet data were calculated using data from the corresponding test run for each baghouse inlet even though tests were not actually run simultaneously.

Reference 7.

Table 21

FACILITY I (Baghouse No.'s 1 and 2 Outlet)[1]

Summary of Results

Run Number	1	2	3	Average
Date	12/15/72	12/~~18~~/72	12/18/72	-
Test Time-minutes	120	97	96	104.3
Baghouse Section No.	1	6	10	-
Total Furnace Capacity - tons	425	425	425	425
Baghouse Inlet Flow Rate - DSCFM	868,692	840,169	840,482	849,781
Stack Effluent				
Flow rate - ACFM	88,952	85,568	93,316	88,612
Flow rate - DSCFM	80,809	78,818	85,848	81,825
Temperature - ^{o}F	105	110	110	108.3
Water vapor - Vol. %	0.9274	0.9365	1.0605	0.9748
CO_2 - Vol. % dry	0.30	0.27	0.29	0.287
O_2 - Vol. % dry	19.20	19.40	19.30	19.30
CO - Vol. % dry	0	0	0	0
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0016	0.0019	0.0009	0.0015
gr/ACF	0.0015	0.0017	0.0008	0.0013
lb/hr[2]	11.91	13.68	6.48	10.93
lb/hr per ton of furnace capacity	0.028	0.032	0.015	0.026
Total Catch				
gr/DSCF	0.0046	0.0040	0.0027	0.0038
gr/ACF	0.0042	0.0037	0.0025	0.0035
lb/hr[3]	34.25	28.81	19.45	27.68
lb/hr per ton of furnace capacity	0.081	0.068	0.046	0.065

(1) Three baghouses are used to control this shop. Baghouses 1 and 2 are in a common structure and both exhaust through one set of stacks.
(2) Calculated as product of front half grain loading and total baghouse inlet flow.
(3) Calculated as product of total catch grain loading and total baghouse inlet flow.

Reference 7.

Table 22

FACILITY I (Baghouse No. 3 Outlet)[1]

Summary of Results

Run Number	1	2	3	Average
Baghouse Section No.'s	13 & 14	7 & 8	1 & 2	-
Date	12/13/72	12/13/72	12/14/72	-
Test Time-minutes	133	120	128	127.0
Total Furnace Capacity - tons	425	425	425	425
Baghouse Inlet Flow Rate - DSCFM	529,390	529,925	532,589	530,635
Stack Effluent				
Flow rate - ACFM	77,884	92,805	86,279	85,656
Flow rate - DSCFM	73,119	86,853	80,776	80,249
Temperature - °F	100	100	100	100
Water vapor - Vol. %	0.8049	1.1153	1.0795	0.9999
CO_2 - Vol. % dry	0.30	0.30	0.30	0.30
O_2 - Vol. % dry	20.00	20.00	20.00	20.00
CO - Vol. % dry	0	0	0	0
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0002	0.0003	0.0002	0.0002
gr/ACF	0.0002	0.0003	0.0002	0.0002
lb/hr[2]	0.91	1.36	0.91	0.91
lb/hr per ton of furnace capacity	0.002	0.003	0.002	0.002
Total Catch				
gr/DSCF	0.0008	0.0009	0.0008	0.0008
gr/ACF	0.0007	0.0008	0.0008	0.0008
lb/hr[3]	3.63	4.09	3.65	3.64
lb/hr per ton of furnace capacity	0.009	0.010	0.009	0.009

(1) Three baghouses are used to control this shop.
(2) Calculated as product of front half grain loading and total baghouse inlet flow.
(3) Calculated as product of total catch grain loading and total baghouse inlet flow.

Reference 7.

Table 23

FACILITY I (Overall Outlet Data)

Summary of Results

Run Number (1)	1	2	3	Average
Date	-	-	-	-
Test Time-minutes	-	-	-	-
Total Furnace Capacity - tons	425	425	425	425
Baghouse Inlet Flow Rate - DSCFM	1,398,082	1,370,084	1,373,071	1,380,416
Stack Effluent				
Flow rate - ACFM	-	-	-	-
Flow rate - DSCFM	-	-	-	-
Temperature - °F	-	-	-	-
Water vapor - Vol. %	-	-	-	-
CO_2 - Vol. % dry	-	-	-	-
O_2 - Vol. % dry	-	-	-	-
CO - Vol. % dry	-	-	-	-
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	-	-	-	-
gr/ACF	-	-	-	-
lb/hr	12.82	15.04	7.39	11.75
lb/hr per ton of furnace capacity	0.030	0.035	0.017	0.027
Total Catch				
gr/DSCF	-	-	-	-
gr/ACF	-	-	-	-
lb/hr	37.88	32.90	23.10	31.29
lb/hr per ton of furnace capacity	0.089	0.077	0.054	0.073

(1) Overall inlet data were calculated using data from the corresponding test run for each baghouse outlet even though tests were not actually run simultaneously.

Reference 7.

Table 24

FACILITY J (Baghouse Inlet)

Summary of Results

Run Number	1	2	3	
Date	12/12/72	12/12/72	12/12/72	Average
Test Time - Minutes	133	130	139	134
Total Furnace Capacity - tons	50	50	50	50
Shop Effluent				
Flow rate - ACFM	224,001	223,981	224,108	224,030
Flow rate - DSCFM	209,560	209,472	209,050	209,360
Flow rate - DSCFM/ton of furnace capacity	4190	4190	4180	4187
Temperature - ^{o}F	100	100	100	100
Water vapor - Vol. %	0.915	0.948	1.20	1.02
CO_2 - Vol. % dry	0.23	0.21	0.23	0.22
O_2 - Vol. % dry	19.70	20.00	19.80	19.83
CO - Vol. % dry	0	0	0	0
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0182	0.0179	0.0393	0.0251
gr/ACF	0.0170	0.0168	0.0367	0.0235
lb/hr	32.63	32.20	70.45	45.09
lb/hr per ton of furnace capacity	0.653	0.644	1.41	0.902
Total catch				
gr/DSCF	0.0188	0.0184	0.0399	0.0257
gr/ACF	0.0176	0.0172	0.0373	0.0240
lb/hr	33.85	33.08	71.57	46.17
lb/hr per ton of furnace capacity	0.677	0.662	1.43	0.923

Reference 7.

Table 25

FACILITY J (Baghouse Exhaust)

Summary of Results

Run Number	1	2	3	Average
Baghouse Section No.	10	5	1	-
Date	12/12/72	12/12/72	12/12/72	-
Test Time-minutes	120	120	120	120
Total Furnace Capacity - tons	50	50	50	50
Baghouse Inlet Flow Rate - DSCFM	209,560	209,472	209,050	209,360
Stack Effluent				
Flow rate - ACFM	16,583	17,732	16,738	17,018
Flow rate - DSCFM	15,774	16,821	15,896	16,164
Temperature - °F	91	91	91	91
Water vapor - Vol. %	1.11	1.38	1.27	1.25
CO_2 - Vol. % dry	0.22	0.20	0.21	0.21
O_2 - Vol. % dry	19.80	20.00	19.90	19.90
CO - Vol. % dry	0	0	0	0
Visible Emissions - % opacity	-	-	-	-
Particulate Emissions				
Probe and filter catch				
gr/DSCF	0.0003	0.0009	0.0001	0.0004
gr/ACF	0.0002	0.0008	0.0001	0.0004
lb/hr (1)	0.539	1.62	0.179	0.779
lb/hr per ton of furnace capacity	0.011	0.032	0.004	0.016
Total Catch				
gr/DSCF	0.0013	0.0014	0.0025	0.0017
gr/ACF	0.0013	0.0014	0.0024	0.0017
lb/hr (2)	2.34	2.51	4.48	3.11
lb/hr per ton of furnace capacity	0.047	0.050	0.090	0.062

(1) Calculated as product of front half grain loading and total baghouse inlet flow.
(2) Calculated as product of total catch grain loading and total baghouse inlet flow.

Reference 7.

Table 26

FACILITY M

Summary of Results

Run Number	1[1]	2[2]	Total Calculated Particulate Emissions
Date	8/28/73	9/6/73	-
Test Time-minutes	240	192	-
Total Furnace Capacity - tons	110	224	224
Stack Effluent			
Flow rate - ACFM	154,650	244,500	-
Flow rate - USCFM	129,800	220,400	480,000[3]
Flow rate - DSCMF/ton of furnace capacity	1,180	984	2,143
Temperature- °F	107	118	-
Water vapor - Vol.%	3.16	2.13	-
CO_2 - Vol.% dry	--	-	-
O_2 - Vol.% dry	--	-	-
CO - Vol.% dry	--	-	-
Visible Emissions - % opacity	--	-	-
Particulate Emissions			
Probe and Filter Catch			
gr/USCF	0.0026	0.0073	0.0047[4]
gr/ACF	0.0022	0.0066	-
lb/hr	2.87	13.8	19.5[3]
lb/hr per ton of furnace capacity	0.026	0.061	0.087
Total Catch			
gr/USCF	0.0067	0.0096	0.0080[4]
gr/ACF	0.0056	0.0086	-
lb/hr	7.52	18.1	33.1[3]
lb/hr per ton of furnace capacity	0.068	0.081	0.148

(1) Test of one of two identical baghouses, each serving a direct shell evacuation system on one furnace only.

(2) Test of a baghouse serving canopy hoods collecting charging and tapping emissions from three furnaces, only two of which were in operation at the time.

(3) Calculated as the sum of twice the corresponding value from column 1 (since there are two direct shell baghouses) and the corresponding value from column 2.

(4) Calculated as $\frac{2 \times 129,800 \times A + 220,400 \times B}{480,000}$ where A = particulate loading from column 1 and B = particulate loading from column 2.

Reference 8.

Table 27

FACILITY M

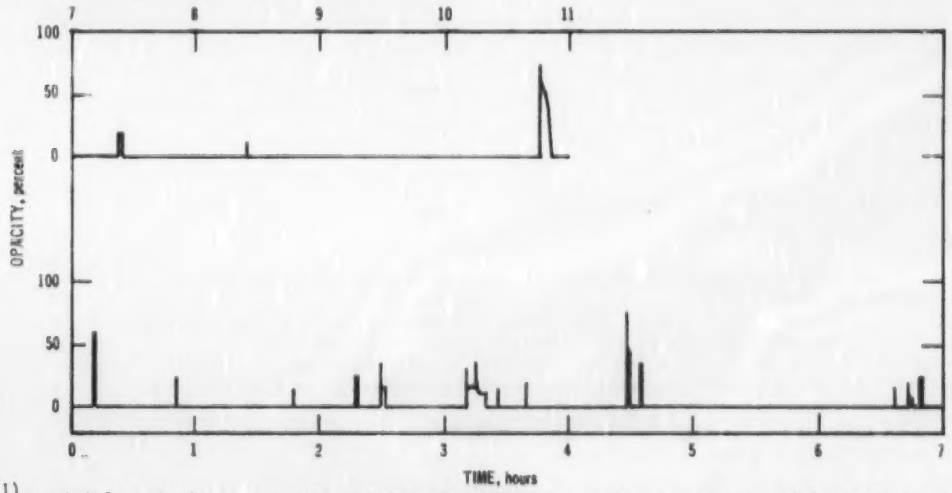
SUMMARY OF VISIBLE EMISSIONS

Date:	2/5/74 and 2/6/74		Morning: 175 yd Afternoon:
Type of Plant:	Electric Arc Furnace Shop		
Type of Discharge:	Monitor	Distance from Observer to Discharge Point:	350 yds.
Location of Discharge:	Shop Roof Above Furnace A(1)	Height of Observation Point:	~30 ft.
Height of Point of Discharge:	~80 ft.	Direction of Observer from Discharge Point:	Southwest
Description of Background:	Sky in the morning; Brown field in the afternoon.		
Description of Sky:	Clear on 2/5, Overcast on 2/6		
Wind Direction:	Northwest on 2/5	Wind Velocity: 2/5: 5-20 2/6: calm	mi/hr
Color of Plume:	Varied - white and brown-red	Detached Plume: No	
Interference of Steam Plume:	No		
Duration of Observation:	10 hrs., 58 min.		

Summary of Data: (2)

Opacity, Percent	Total Time Equal to or Greater Than Given Opacity		Opacity, Percent	Total Time Equal to or Greater Than Given Opacity	
	Min.	Sec.		Min.	Sec.
5	37	0	55	4	0
10	31	15	60	2	0
15	24	45	65	0	45
20	17	0	70	0	30
25	12	0	75	0	0
30	8	45	80	-	-
35	7	0	85	-	-
40	6	0	90	-	-
45	5	45	95	-	-
50	5	15	100	-	-

Sketch Showing How Opacity Varied With Time: (2)



(1) No visible emissions were observed from the baghouse serving furnaces A and B during two hours of observation on 2/5/74.

(2) Higher values of two observers reading simultaneously.

Reference 9.

Table 28

FACILITY M

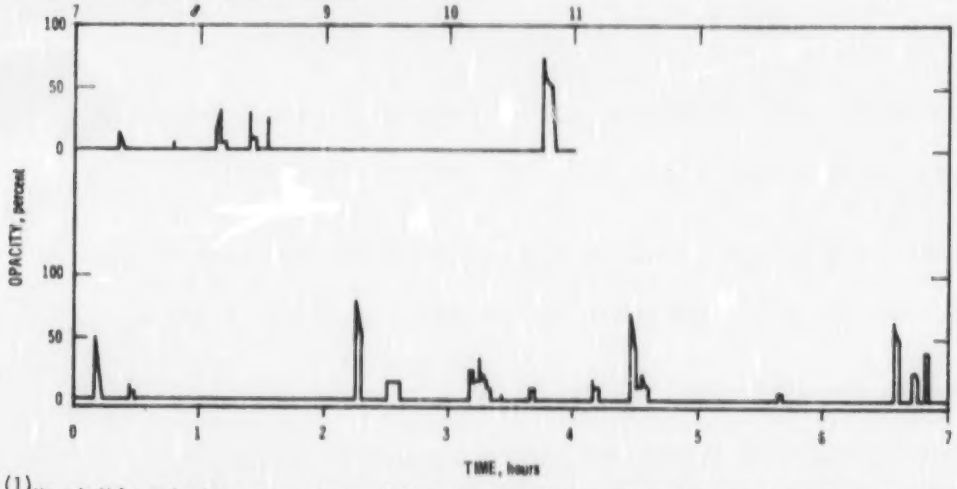
SUMMARY OF VISIBLE EMISSIONS

Date:	2/5/74 and 2/6/74		Morning: 175 yds. Afternoon:
Type of Plant:	Electric Arc Furnace Shop		
Type of Discharge:	Monitor	Distance from Observer to Discharge Point:	350 yds.
Location of Discharge:	Shop Roof Above Furnace B(1)	Height of Observation Point:	~30 ft.
Height of Point of Discharge:	~80 ft.	Direction of Observer from Discharge Point:	Southwest
Description of Background:	Sky in the morning; Brown field in the afternoon.		
Description of Sky:	Clear on 2/5, Overcast on 2/6		
Wind Direction:	Northwest on 2/5	Wind Velocity:	2/5: 5-20 mi/hr
Color of Plume:	White or brown-red	Detached Plume:	2/6: calm No
Interference of Steam Plume:	No		
Duration of Observation:	10 hrs., 58 min.		

Summary of Data:(2)

Opacity, Percent	Total Time Equal to or Greater Than Given Opacity		Opacity, Percent	Total Time Equal to or Greater Than Given Opacity	
	Min.	Sec.		Min.	Sec.
5	64	15	55	6	45
10	51	45	60	5	0
15	33	45	65	2	30
20	25	15	70	1	45
25	19	30	75	0	30
30	15	45	80	0	15
35	13	15	85	0	0
40	12	0	90	-	-
45	10	30	95	-	-
50	8	45	100	-	-

Sketch Showing How Opacity Varied With Time:(2)



(1)No visible emissions were observed from the baghouse serving furnaces A and B during two hours of observation on 2/5/74.

(2)Higher values of two observers reading simultaneously.
Reference 9.

REFERENCES

1. "Source Testing Report - [Plant A]", prepared for EPA by Roy F. Weston, Inc., Contract No. 68-02-0240, January, 1974. EMB Test No. 73-ELC-1.

2. "Inlet and Outlet Dust Concentration on Baghouse Filter System at [Plant B]," December 23, 1970. Submitted by the Assistant Vice President, Engineering and Construction, for Plant B, October 10, 1972.

3. "Test Conducted at [Plant C]," Local Control Agency Test Report, February 28, 1966. Submitted by the owner of Plant C on March 21, 1973.

4. Seiffert, Randy D., EPA, "Trip Report for Plant Visits to [Facilities C and G]," March 23, 1974.

5. Pfaff, Roger G., EPA, "Emission Testing Report" for tests conducted at Plant D on December 19, 1972. EMB Test No. 73-ELC-3.

6. Pfaff, Roger G., EPA, "Emission Testing Report" for tests conducted at Plant E on December 15-16, 1972, EMB Test No. 73-ELC-2.

7. "Performance Evaluation of the Baghouses Installed [at Plants I and J]," December 1, 1972. Submitted by the owner of Plants I and J.

8. "Particulate Emission Tests for [Plant M] - Electric Melt Shop, Direct Shell Tap Fume Control System and Canopy Evacuation System," September 28, 1973. Submitted by the vendor of the control system on March 15, 1974.

9. Trenholm, Andrew R., EPA, "Trip Report for Tests of Visible Emissions at [F ..ity M]," May 20, 1974.